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I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002951386 for a patent by COLIN W FRANCIS and NEIL JOHN STEPHENS as filed on 02 September 2002.



WITNESS my hand this  
Tenth day of September 2003

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**AUSTRALIAN**  
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**COMPLETE SPECIFICATION**  
**STANDARD PATENT**

**RE-TRIEVABLE SELF-COMPACTING SCREWED PILE**

**The invention is described in the following statement**

**RETRIEVABLE SELF COMPACTING PILE**

- 0      This invention relates to a screwed pile designed to be able to re- compact the soil above the auger after the pile has been screwed into the ground. Thus enabling the pile to take horizontal as well as vertical loading and to be retrievable and re-useable.**
- 5      Many applications in the construction and building industries require the use of a temporary pile to support or maintain the position of an item or part of the building or structure or a temporary structure or item of plant required for use in that construction.**
- 10     The current range of screwed or driven piles are not easily retrieved at the completion of their use nor are screwed piles suitable for side loads because as the pile is screwed into the ground the earth is disturbed rendering it unsuitable for side or lateral loading due to the loss of compaction around the top of the pile.**
- 15     Where side or lateral loading is required, the current practice is to bore a hole into the ground and construct a concrete reinforced pile designed to take the required side or lateral loading. This is both expensive and time consuming in the construction of the pile and the time lost waiting for the concrete to cure and for the strength of the concrete to come up to a point where side loads can be applied.**
- 20     A concrete pile may be able to be left in the ground after use but in many cases its location may require its removal with all the associated cost and delays.**
- 25     These problems are over come with the present invention, which provides a screwed pile and a device for the installation of that pile to a pre determined Vertical loading. Once the auger section of the pile is installed the device compact the ground above the auger to a predetermined compaction providing stability to the top or ground level section of the pile which is then suitable for immediate side or lateral loading.**
- 30     The device is fitted to a suitable hydraulic auger drive unit which allows for the device to pick up the self compacting pile, position it with the point in correct location, screw the auger section into the ground and then compact the soil above the auger all operations carried out by a single operator. The removal of the pile after use is again a one-person operation.**

## RETRIEVABLE SELF COMPACTING PILE

0     The use of the pile described in this specification is not limited to temporary piling it's use as a permanent pile will find many applications. The size and required depth of the pile may be changed to suit the required loading. Materials of construction can also be changed to suit ground and environmental situations.

5     To assist with understanding the invention, reference will now be made to the accompanying drawings, which show one example of the invention.

10    Fig 1 Shows a telescopic screwed pile consisting of a top mounting plate ( Fig 1/1 ) with 4 fins ( Fig 1/5 ) mounted on the underside of the mounting plate position so as to form a square into which the pile extension shaft ( Fig 1/7 ) is allowed to slide but not rotate. In this mounting plate there are 4 Keyhole screwing attachment points into which the installing device is locked. There are also any number of tapped or threaded holes for the location and mounting of the end use attaching devices.

15    In the center of the mounting plate there is a square ( Fig 1/2 ) nut which provides both the alignment for the drive pins of the installing device and the drive for the Rotating section ( Fig 2/12 ) left hand screw within the nut ( Fig2/13 )

20    Under the square nut is either a brass or roller thrust race depending on required On the under side of the mounting plate, 4 fins ( Fig1/5 ) are located these fins are either constructed to form the outer square tube or welded to a section of square tube ( RHS ) these fins have a dual function ( a ) providing a lead into the ground as the top mounting plate is brought down to apply load to the ground and to provide lateral stability to the top of the screwed pile

25    The compaction unit ( Fig 1/10 ) only rotates until the auger (Fig 1/8 ) has meet the require pre-determined toque or depth at which the drive pins ( Fig 3/1 ) are disengaged allowing the auger drive unit to freely rotate the square nut ( Fig 2/2 ). As the nut rotates the left hand threaded rod down through the fixed nut ( Fig 2/13 )in

30    center of the extension pile shaft.

## RETIEVALABLE SELF COMPACTING SCREWED PILE

- 0 As the threaded rod rotates the compaction unit ( Fig 2/10 ) is drawn into the disturbed earth around the top of the pile. With the fins drawn fully into the soil the top mounting plate ( FIG 1/1 ) comes in contact with the earth above the auger. With the mounting plate ( Fig 1/1 ) in contact with the ground the rotation of the square
- 1 nut ( Fig 2/13 ) is continued drawing the top plate into the disturbed earth around the top of the pile, this applies a compacting pressure to the earth which is continued until the pre-determined thrust is reached forming a compacted area of soil between the auger and the mounting plate stabilizing the area.
- 10 With the auger taken to it's predetermined load and the top mounting plate compacting and stabilising the soil at the top of the pile the pile is now suitable for both compression and lateral loading.
- 15 To remove the pile after use the square nut (Fig 1/2 ) is rotated clockwise which jacks the directional load fins ( Fig 1/5 ) clear of the ground. When the directional load fins are clear of the ground the drive pins ( Fig 3/1 ) of the installing device are engaged and the pile rotated counter clockwise screwing the auger and pile out of the ground.
- 20 With the pile free of the ground and cleaned it is ready for re-use.
- 25 The device ( Fig 3 ) for the installation and removal of these screwed piles is an attachment that is fitted to a standard hydraulic auger drive of required the torque, being manufactured for dual speed operation and reversible .
- 30 The device consists of dual driving system with a square center drive which when positioned above the pile firstly locates on the square nut ( Fig 1-2 ) this aligns the drive pins of the floating drive plate to the PCD of the holes in the main mounting plate ( Fig 1/1 ) at which time the floating plate is slowly rotated until the drive pins engage in the key holes ( Fig 1-4 ) of the main mounting plate.
- With the pins engaged the screwed pile can be lifted from its storage mount and transferred to its required position. With the pile in the required position the auger drive is engaged and the pin screwed into the ground to the pre determined depth or torque.

## RETRIEVABLE SELF COMPACTING SCREWED PILE

- 0     The hydraulic pressure required to drive the pile into the ground is recorded and displayed on a printout, providing a permanent record and information for quality control records.
- 5     When the screwed pile has been driven to the required torque the floating drive plate ( Fig 3/9 ) is backed off disengaging the drive pins ( Fig 3/7 ) raised by retracting the hydraulic rams to remove the drive pins ( Fig 3/7 ) from the mounting plate ( Fig 1/1 ) leaving the square drive ( Fig 3/8 ) still engage to the square nut ( fig 1-2 ).
- 10    With drive pins disengaged the square nut ( Fig 1-2 ) is rotated counter clockwise driving the LH screw ( Fig 1/12 ) down through the fixed nut ( Fig 2/13 ) drawing the stabilizing fins into the earth as the two half of the screwed pile telescope together .
- 15    When the compaction plate ( Fig 2-1 ) comes in contact with the ground the square nut is still turning counter clock wise screwing the LH screw down through the fixed nut and the screwing is continued until the required compaction of the earth between the auger ( Fig 1/8 ) and the
- 20    Mounting plate ( Fig 1/1 ) is achieved.
- The hydraulic pressure required to turn the square nut ( Fig 1-2 ) is recorded providing a record of the compaction for reference and QA.
- 25    If the pile is to be removed following its use then the device is connected firstly to the square nut ( fig 1-2 ) and the nut turned clockwise lifting the compaction/mounting plate ( Fig 1/1 ) and the stabilizing fins ( Fig 1/5 ) clear of the ground with the fins clear the floating drive plate is lowered and the drive pins engaged.
- 30    With the drive pins ( Fig 3/7 ) engaged the whole unit is rotated counter-clockwise screwing the auger and the complete pile from the ground. When the pile is clear of the ground the pile is returned to the storage unit and the drive pins disengaged from the floating drive plate and then the square nut.

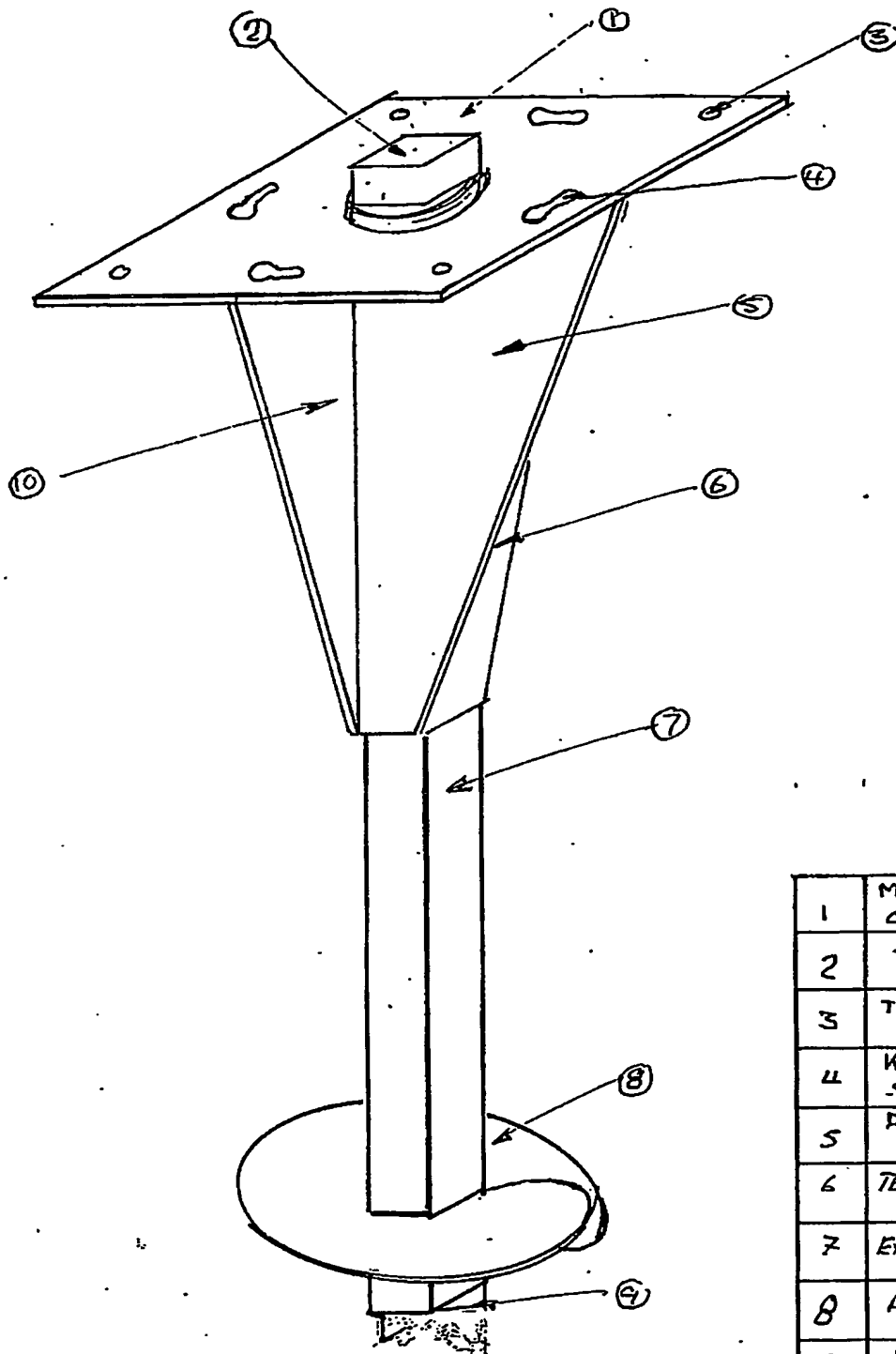


FIG 1 RE-TURABLE SELF COMPACTING  
SCREWED PILE

1	MAIN MOUNTING PLATE & COMPACTION PLATE
2	SQUAR NUT
3	THREADED HOLES
4	KEY HOLES FOR SCREWING DEVICE
5	DIRECTION LOAD FIN
6	TELESCOPING EXTENSION
7	EXTENDING PILE SHAFT
8	AUGER BLADE
9	DUAL CENTERING & CUTTING POINTS
10	COMPACTION UNIT

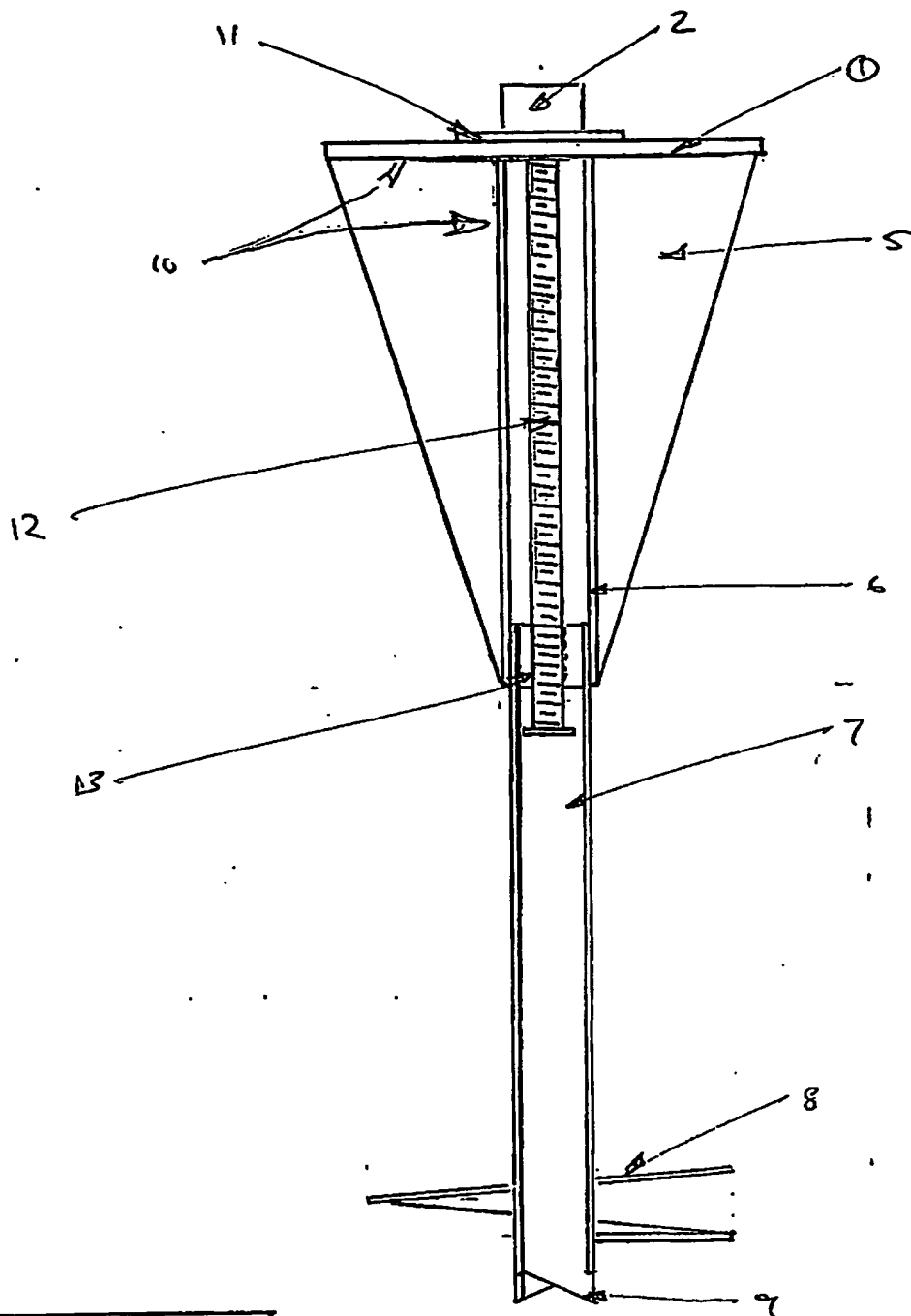


FIG:2

RETRIEABLE SELF COMPACTING  
SCREWED PILE

1	COMPACTION PLATE
2	SQUARE NUT
3	NOT SHOWN
4	NOT SHOWN
5	DIRECTION LOAD FIN
6	TELESCOPING EXTENSION
7	EXTENSION PILE SHAFT

8	AUGER BLADE
9	DUAL CUTTING POINT
10	COMPACTING UNIT
11	THRUST WASHER
12	W/H SCREW
13	W/H NUT



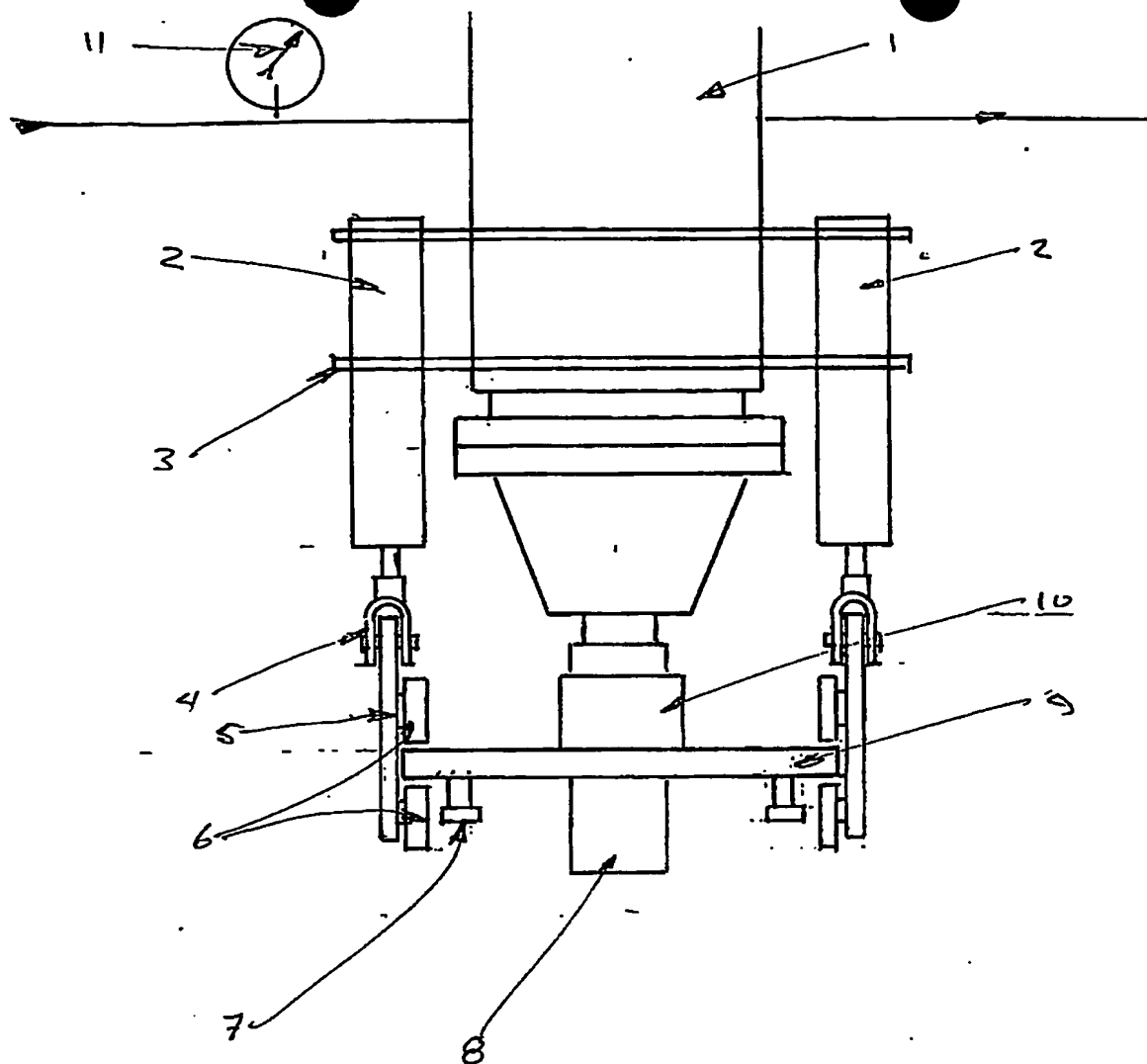


FIG: 3  
RE-TREIVABLE SELF COMPACTING  
SCREWED PILE

1	AUGER DRIVE UNIT
2	HYDRAULIC LIFT CYLINDERS
3	CYLINDER CLAMPING YOKE
4	MOUNTING TRUNION
5	ROLLED BEARINGS MOUNTING PLATE
6	ROLLER BEARINGS

7	DRIVE PINS
8	SQUARE DRIVE
9	FLOATING DRIVE PLATE
10	SH DRIVE FOR FLOATING DRIVE PLATE
11	
12	

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